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10/705,599	11/10/2003	Christopher M. Weikart	62274B	5566

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Intellectual Property Section
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EXAMINER	
LAFOND, RONALD D	
ART UNIT	**PAPER NUMBER**
1792	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/705,599	WEIKART ET AL.
	Examiner	Art Unit
	RONALD D. LAFOND	1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 December 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 and 12-15 is/are pending in the application.

4a) Of the above claim(s) 13 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10,12,14 and 15 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10 November 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Amendments of December 20, 2007, were received and have been entered. Claims 1, 9, 10, and 12 – 14 are acknowledged as amended. Claims 11 and 16 – 20 are acknowledged as canceled. This Action is in response to amended Claims 1 – 10 and 12 – 15, which are currently pending.

2. In the reply to the species election requirement originally filed on July 20, 2007, Applicants elected Species A, the embodiment wherein the porous injector has porosity increasing in a stepwise fashion. Therefore, Claim 13 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic claim. The Examiner notes that the status identifier for Claim 13 as amended states "(currently amended)", but should read "(withdrawn, amended)" or some equivalent status. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 6 – 10, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Namiki (United States Patent 5,641,559) in view of Thomas, et al. (United States Patent 5,378,510, hereafter Thomas), and Fayet, et al. (International Patent Application Publication WO 97/44503, hereafter Fayet).

5. Regarding Claim 1, Namiki teaches a process for preparing a protective barrier for a container having an internal surface (see Column 2, lines 12 – 16, and Column 14, lines 34 – 35 and Figure 3) comprising the steps of: a) plasma polymerizing under partial vacuum (see Column 6, lines 10 – 31 and lines 55 – 67) and in an oxygen-rich atmosphere a first organosilicon compound under conditions to deposit a polyorganosiloxane layer of uniform thickness (see Column 8, lines 20 – 30 and Table 1 on Column 7, lines 1 – 18); and b) plasma polymerizing under partial vacuum a second organosilicon

compound under conditions to deposit a silicon oxide layer of uniform thickness superposing the same polyorganosiloxane layer (see Column 10, lines 40 – 57, and Claims 1 and 4 on Column 14, lines 64 – 66, Column 15, lines 1 – 6, and Column 16, lines 1 – 12).

6. Namiki does not teach the process wherein the plasma polymerized layers are deposited onto the internal surface of the container, nor wherein oxygen and the first and second organosilicon compounds are fed through a tubular, open-ended injector positioned within the container and wherein an electromagnetic field is applied from the outside of the container to ignite and sustain the plasma. However, Thomas teaches just such limitations, wherein "a barrier coating is formed on a polymeric article, such as on the interior of a thermoplastic container" (see Abstract); wherein the oxygen and the organosilicon compounds are fed through tubular, open-ended injector positioned within the container (see Column 9, lines 3 – 30; Column 11, lines 57 – 68; Column 12, lines 1 – 38; and Figures 1, 2, and 4); and wherein an electromagnetic field is applied from the outside of the container to ignite and sustain the plasma (see Figure 1, especially electrodes 80, 24, and 32; Column 7, lines 21 – 29; Column 8, lines 27 – 47; and Column 9, lines 31 – 60). Moreover, Thomas teaches the deposition of these barrier layers to solve the same problem that Namiki addresses, which is the use of plasma polymerized layers in order to make these composites less permeable to atmospheric gases (see Column 2, lines 12 – 24 of Namiki; and Column 1, lines 14 – 68, and Column 2, lines 1 – 58 of Thomas). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki by depositing a protective barrier onto the internal surface of the container as taught by Thomas (e.g., wherein oxygen and the first and second organosilicon compounds are fed through a tubular, open-ended injector positioned within the container and wherein an electromagnetic field is applied from outside the container to ignite and sustain the plasma), because both Namiki and Thomas disclose coating containers with plasma polymerized films in order to reduce permeability of these composites to atmospheric gases.

7. Still regarding Claim 1, Namiki in view of Thomas does not teach the process wherein the injector is porous and wherein porosity of the injector increases toward the base of the container. Regarding the first limitation, Fayet teaches the process wherein a porous injector is used in the plasma deposition of

barrier films from organosilicon precursors in the presence of oxygen and under partial vacuum on the interior surface of a container (see Abstract, and Page 9, lines 14 – 23). Fayet also teaches, in Page 4, lines 18 – 29, that "it is now the object of the invention to create a method … for treating the inside of containers, in particular containers with a narrow opening and containers made of heat sensitive material. … Furthermore, the inventive method is to solve the problem of the even distribution of the reactant gas/vapour mixture in a more simple way than known such methods. The inventive apparatus is to be simple and adaptable for batchwise operation, i.e. for simultaneous treatment of a plurality of containers within the same apparatus." Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas by utilizing the porous injector as taught by Fayet, because Fayet teaches that such injectors are known in the art, and because Fayet teaches their use to achieve uniform deposition of thin barrier films on the interior surfaces of plastic containers.

8. Regarding the second limitation, while Fayet does not explicitly teach the process wherein the porosity of the porous injector increases toward the base of the container, Fayet does teach, in Column 6, lines 22 – 30, that "for establishing a gas/vapour concentration in the plasma being as homogeneous as possible, the perforation or porosity of the wall of the inner member forms a regular pattern over the surface of the inner member. If the plasma area, e.g. due to a complicated shape of the container to be treated, contains regions of different widths, the perforation pattern is designed such that in regions of wider plasma (larger distance between inner member and container wall) accordingly more gas/vapour passes through the wall of the inner member due to more and/or larger perforations or pores in this area." That is, Fayet is explicitly teaching the idea that different porosities may be used in different sections of the inner member/injector, and that larger perforations or more pores may be used to increase the porosity of the member to increase vapor flow. In the case where the substrate container is wider at the bottom section, Fayet provides the motivation to increase the porosity in that bottom section to allow for more vapor flux into that section. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas and Fayet by using a porous injector, wherein porosity increases toward the base of the container, to

have achieved successful deposition of uniform thin films on the inner surface of containers with increasing widths as taught by Fayet.

9. Regarding Claim 2, Namiki does not explicitly teach the limitation wherein plasma polymerizing steps are carried out at such power densities and concentrations of the first and second organosilicon compounds and for such a time so that the combined thickness of the polyorganosiloxane and silicon oxide layers is less than 400 Å. However, Namiki does teach that the combined thickness of the polyorganosiloxane and silicon oxide layers may be 400 Å (see Column 3, lines 57 – 60, wherein Namiki teaches that the polymerized organosilicic layer is 0.01 μm, which is 10 nm or 100 Å; and Column 4, line 5, wherein Namiki teaches that the silicon oxide film layer is 0.03 μm, which is 30 nm or 300 Å). It would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas and Fayet by plasma polymerizing the silicon oxide layer to a thickness of slightly less than 300 Å such that the total thickness of the two layers was less than 400 Å with a reasonable expectation of creating a functioning protective barrier, because Namiki teaches that controlling the growth of the first layer to only 100 Å is possible, which implies that it is possible to similarly control the growth of the silicon oxide layer to such thin limits, and because Namiki does not teach away from thinner silicon oxide layers of less than 300 Å by stating that this thickness is critical to the barrier layer performance.

10. Regarding Claim 6, Namiki teaches the process wherein the polyorganosiloxane is represented by the formula $SiO_xC_yH_z$, where x is 2.3, y is 0.4 and z is greater than or equal to zero (see Table 1, Comparison Example 3, on Column 7, line 16, and Claims 1 and 4), and the silicon oxide layer is represented by the formula SiOx, where x is from 1.5 to 2.0 (see Column 10, lines 40 – 57, and Claims 1, 2, and 4, on Column 14, lines 64 – 66, Column 15, lines 1 – 10, and Column 16, lines 1 – 12).

11. Regarding Claims 7 and 8, Namiki teaches the process wherein the container comprises a plastic that may be polyethylene terephthalate, polyethylene, polypropylene, etc. (see Column 5, lines 12 – 20, Column 10, lines 27 – 28, Column 14, lines 33 – 46, and Claim 4 on Column 16, lines 1 – 12).

12. Regarding Claim 9, Thomas teaches the process wherein the injector is further characterized by being coaxial (see, e.g. Column 6, lines 58 – 68 and Column 7, lines 1 – 6).

13. Regarding Claim 10, Thomas teaches the process wherein the injector extends almost the length of the container (see, e.g., Column 11, lines 57 – 68, Column 12, lines 1 – 38, and Figures 1 and 2).

14. Regarding the limitation of Claim 12 that porosity increase in a stepwise fashion, any increase in porosity must necessarily increase in a stepwise fashion in an injector that contains holes/pores, because only a discrete number or total area of holes can be achieved per unit length. Therefore, the teaching and motivation discussed for Claim 1 inherently teaches the limitations of Claim 12 as well.

15. Regarding Claim 14, Fayet teaches the process wherein the inside and the outside of the container are both maintained at a partial vacuum, wherein the partial vacuum of the outside of the container is set a) so as not to allow plasma formation on the outside of the container; and b) so as to be different from the partial vacuum on the inside of the container (see Column 5, lines 5 – 22, Column 8, lines 14 – 26, and Column 9, lines 1 – 5).

16. Regarding Claim 15, Fayet teaches the process wherein the partial vacuum on the inside of the container is in the range of 1 μbar to 100 mbar, and the partial vacuum on the outside of the container is greater than 100 mbar or less than 1 μbar (see same citations as for Claim 14, discussed above).

17. Claims 3 – 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Namiki in view of Thomas and Fayet, and further in view of Nemani, et al. (United States Patent Application Publication US 2002/0142104 A1, hereafter Nemani) and Goto, et al. (United States Patent 6,451,390 B1, hereafter Goto). Namiki, Thomas, and Fayet are cited for the same reasons discussed above, which are incorporated herein.

18. Regarding Claim 3, Namiki in view of Thomas and Fayet does not teach the process wherein the first plasma polymerizing step is carried out at a deposition rate of greater than 50 Å/sec and less than 500 Å/sec and the second plasma polymerizing step is carried out at a deposition rate of greater than 10 and less than 100 Å/sec. Nemani teaches the plasma polymerization of organosilicon compounds in the presence of oxygen and under partial vacuum to form polyorganosiloxane layers at such power densities, concentrations, deposition times and other parameters to enable deposition rates of about 16.6 Å/sec to about 333 Å/sec (0.1 microns/minute to 2 microns/minute) (see Paragraphs [0034] – [0038]). It has been held that, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art," a

prima facie case of obviousness exists. *In re Wertheim,* 541 F.2d 257, 191 USPQ OP (CCPA 1976). See also MPEP 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas and Fayet by employing the plasma deposition conditions taught by Nemani to have deposited the polyorganosiloxane layer at the rates taught by Nemani, because Nemani teaches that such conditions and rates are known in the art to deposit organosilicon/organosilane materials as required by Namiki in view of Thomas.

19. Similarly, Goto teaches the plasma polymerization of silicon oxide using an organosilicon compound in the presence of oxygen and under partial vacuum and at such power densities and concentrations to enable a deposition rate of 18.3 Å/sec (1100 Å/min) (see Column 3, lines 24 – 53). Therefore, it also would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas, Fayet, and Nemani by employing the plasma deposition conditions taught by Goto to have deposited the silicon oxide layer at the rate taught by Goto, because Goto teaches that such deposition rates conditions and rates are known in the art.

20. Regarding Claim 5, Namiki in view of Thomas, Nemani, and Goto does not explicitly teach the limitation wherein the total plasma polymerizing deposition time is not more than 10 seconds. However, as discussed, Namiki does teach polyorganosiloxane layers of 100 Å thickness and silicon oxide layers of 300 Å thickness. Moreover, Goto teaches, in Column 3, lines 34 – 52, that "in one embodiment of the method for producing a silicon dioxide film of the invention, the silicon dioxide film is deposited at a rate at of less than 1100 angstroms/min, and the energy for plasma generation is intermittently supplied at a supply time interval of, for example, 1150 watts for 1 second and brought to at or about, for example, zero watts, for a time interval of, for example, 3 seconds. One skilled in the art would readily appreciate that deposition rate is hardware dependent. Thus, one skilled in the art would also readily appreciate that the required rate and the required pulse strength and on and off time as well as the required specific parameters to achieve a film having a desired film thickness are machine dependent. For example, by adjusting the parameters of the pulse … and duty cycle …, films of a desired thickness can be achieved.

The method of the invention allows films thinner than 300 Å, e.g., 200 Å, or films thicker than 300 Å to be achieved." Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas, Fayet, Nemani, and Goto by using the guidance regarding deposition conditions and rates taught by Nemani and Goto to have deposited the thin layers of polyorganosiloxane and silicon oxide at the desired thicknesses because there would have been a reasonable expectation of success of achieving such thicknesses, given the overall teachings.

21. Regarding Claim 4, Namiki in view of Thomas, Fayet, Nemani, and Goto does not explicitly teach the limitation wherein the second plasma polymerizing step is carried out at a deposition rate of not less than 30 Å/sec and not greater than 60 Å/sec. However, as discussed above, Goto is teaching that the deposition rate is a result effective variable. It is the Examiner's position that it would have involved only routine experimentation to one having ordinary skill in the art to determine an optimal range of deposition rates based upon the teachings of Namiki, Nemani, and Goto. It has been held that, "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See also MPEP 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the process taught by Namiki in view of Thomas, Fayet, Nemani, and Goto by carrying out the second deposition step at a deposition rate of between about 30 Å/sec and about 60 Å/sec with a reasonable expectation of success, because Goto teaches that the deposition rate of silicon oxide thin films is a result dependent variable and that other deposition rates are possible.

Response to Arguments

22. Applicant's arguments filed on December 20, 2007, have been fully considered but they are not persuasive.

23. The previous rejections of Claims 1 – 12, 14, and 15 under 35 U.S.C. 112, 2nd Paragraph, have been withdrawn in light of Applicants' explanation.

24. The previous rejections of Claims 1, 2, and 6 – 9 under 35 U.S.C. 103(a) over Namiki in view of Thomas have been withdrawn in light of Applicants' amendments to Claim 1.

25. The previous rejections of Claims 3 – 5 under 35 U.S.C. 103(a) over Namiki in view of Thomas, and further in view of Nemani and Goto, have been withdrawn in light of Applicants' amendments.

26. Applicants' arguments with respect to the rejections of original Claims 10 – 12, 14, and 15, which also reflect the current rejections under amended Claim 1 and these amended dependent Claims (minus canceled Claim 11), have been considered but are not persuasive. Applicants first argue that "Fayet requires two elements that are clearly not part of the presently claimed invention. First, Fayet requires than an electrode be inserted into the container." In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). It is the Examiner's position that one having ordinary skill in the art would have readily recognized Thomas and Fayet as very analogous art, and that a skilled artisan would have found it obvious to combine these processes with a reasonable expectation of success for the reasons and motivations discussed above. Applicants also argue that "the present invention is much simpler because the electromagnetic field is applied *entirely* from outside the container ..." In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., an electromagnetic field applied entirely from outside the container) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Regardless, the Examiner also notes that Thomas explicitly teaches this limitation, and that there is nothing in either Thomas or Fayet to suggest that the two processes could not be successfully combined.

27. Finally, Applicants argue that the teachings of Fayet do not teach or suggest a simple tubular injector that has increasing porosity toward the terminal end of the injector. This argument is not persuasive. Fayet does teach a tubular porous injector under the standard of the broadest reasonable interpretation of the Claims as currently constructed.

Conclusion

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RONALD D. LAFOND whose telephone number is (571) 270-1878. The examiner can normally be reached on M - F, 9:30 AM - 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197. If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. D. L./
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792